REMARKS

The Examiner has rejected all of the claims in this case as being either anticipated by the Arai '579 patent as being obvious over the Arai patent in view of the Iwai '920 reference.

Applicant has provided new claims in this case to more particularly point out the inventive concept and to more clearly distinguish Applicant's invention over the teachings of the Arai '579 patent.

The key geometric feature that most clearly structurally distinguishes Applicant's design from Arai is that in Applicant's design the axis of the conical radiation pattern is perpendicular to the plane of the antenna and the plane of the antenna when operative is perpendicular to the plane of the ear piece. This feature is a limitation in all of the clams now in this case.

By contrast, with reference to Arai's FIG. 6(a), it can be seen that the main axis of the two cone beams is at an angle of approximately 40° to the plane of the antenna and that the two lobes are at an angle of approximately 80° to each other. They are not perpendicular to the plane of the antenna. It is this perpendicularity relationship that assures, in Applicant's design, that the transmitting beams will have minimal impact on the user's head.

The Teachings Of The Impact Between The Antenna And The User's Head

Arai '579 in a couple of places (for example column 4, lines 44-47) states that the arrangement taught by Arai makes it "... possible for the antenna not to be affected by the presence of the user's head". It is believed that Arai's major concern is to avoid having the reception by the antenna degraded by virtue of having the user's head deployed between the antenna and the signal being beamed to the mobile phone involved.

By contrast, Applicant is more concerned with minimizing the impact on the user's head of the energy being transmitted by the antenna.

Applicant believes that this difference in the area of concern is in large part responsible for the difference in the structural arrangement now clearly set forth in the claims. The structural arrangement is the geometrical relationship between the plane of the ear piece, the plane of the antenna and the axis of the conical transmission beam.

All of the claims now have this structural relationship set forth therein.

Applicant's FIGs. 5 and 6 and the Arai '579 FIG. 6

Applicant believes that it would help to understand the distinction between Applicant's structure and the Arai structure to comment on the distinction between the showing of the beam intensity in FIG. 6(a) of Arai and the showing of radiation propagation in FIGs. 5 and 6 of Applicant.

Applicant's showings are to the envelope in space in which the radiation travels. The greater compression of the circumferential rings near the origin or apex of the cones is an indication of greater energy intensity. This energy intensity then diminishes as the cone of the conical envelope within which the beam is contained expands along the direction of transmission of the energy.

By contrast, the lobes shown in 6(a) of Arai show the relative energy intensity along various directions of transmission of the signal generated. Thus in 6(a), there are two lobes indicating two separate energy transmission envelopes. In each lobe, the maximum energy intensity is at an angle of approximately 50° to the plane of the antenna. Presumably, each of the lobes will transmit within a conical envelope such as that shown in FIGs. 5 and 6 of Applicant's drawings.

Within the conical envelope, such as shown in Applicant's drawings of FIGs. 5 and 6, the energy distribution intensity is a lobe having its maximum intensity along the

central axis 36 and having a distribution somewhat similar to that shown in FIG. 6(a).

The illustration in Arai's FIG. 6(a) is an energy density illustration rather than an envelope of transmission.

By contrast, the illustration in Applicant's FIGs. 5 and 6 is of an envelope within which the energy is transmitted.

Accordingly, a critical difference between Applicant's design and the Arai design is that in Applicant's design the axis 36 of the conical pattern of energy radiation is perpendicular to the plane 14 of the antenna and, most importantly, the axis 36 is parallel to the plane of the ear piece.

By contrast, the axis of each of the two energy radiation patterns, represented by the lobes of FIGs. 6(a), in Arai are at 50° to the plane of the antenna. Thus, depending on deployment of the antenna plate, one or the other of these beams in Arai will impinge upon the head of the user. Thus, Arai does not do what Applicant's design does; which is to provide a structure that assures minimal radiation impingement on the head of the user.

Total Energy And Energy Intensity

As shown in Applicant's FIGs. 7 and 8, in the prior art an antenna tends to produce an essentially omni directional transmission of energy. This will encompass the head of the user. There is some evidence that such is undesirable.

However, Applicant suggests that the most significant factor in any potential physiological impact on the user is due to the level of energy intensity rather than the total amount of energy that impinges on the user.

Admittedly the following is somewhat speculative. But it is relative to the significant difference between the Arai structure and Applicant's structure.

When one of the two lobes of the Arai transmission impinges upon of the head of the user (because of the way in which the user holds the phone) the energy intensity at or near the axis of transmission of the lobe is likely to be substantially greater than if that same amount of energy were transmitted in an omni directional fashion.

The Arai '579 patent contains a discussion on the bottom of column 5 with respect to degradation and antenna gain or axial ratio being kept small by virtue of the spacing of the patch antenna from the user's head. This keeps the patch antenna sufficiently far from the user's head so that received signals will be minimally degraded by interference by the

user's head. The statement at column 5, line 61, goes on to talk about the fact that there is a second value in spacing the antenna structure from the user's head. The language in the specification is:

". . . and the effective electromagnetic field can be reduced to protect the human body as compared to conventional structures where an antenna is used near the human head". The most reasonable reading of this teaching is the recognition that the design taught by Arai is one in which the transmitted radiation does impinge on the human head and that by moving the antenna to the tip of the deployment element, that impact can be reduced.

By contrast, Applicant teaches a design to substantially avoid impact of the transmitted electromagnetic energy with the head of the user of the head phone.

Summary

Although much still remains to be studied in terms of the impact of electromagnetic energy on human tissue, it is clear that there is strong evidence of some deleterious impact.

Applicant provides a structure and design which assures minimum impact.

Arai, by contrast, is more concerned with a structure that enhances communications through a satellite. In order to serve that purpose, Arai teaches the use of two lobes having axes or transmission that are at 80° to one another thereby

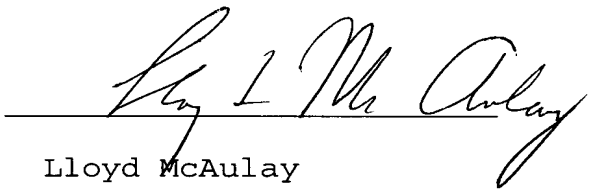
greatly increasing the risk that at least one of these lobes will impinge on the head of the user.

All of the claims call for the unique structural relationship between (a) plane of ear piece, (b) plane of the antenna base, and (c) axis of energy transmission.

Accordingly, Applicant believes this case is in condition for allowance and such is respectfully requested.

The Commissioner For Patents is hereby authorized to charge any additional fees associated with the filing of this application to Deposit Account No. 50-1529.

Respectfully submitted,



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